

CLAIMS

We claim:

1. A method for a first computing device to establish communications with a second computing device, the method comprising:
 - sending a first communications request addressed to a rendezvous service, the first communications request specifying the second computing device; and
 - waiting to receive communications from the second computing device.
2. The method of claim 1 wherein specifying the second computing device comprises specifying an element in the set: a name of the second computing device, a public address of the second computing device, a public address of a Network Address Translator (NAT) behind which sits the second computing device.
3. The method of claim 1 further comprising:
 - establishing communications with the rendezvous service.
4. The method of claim 1 further comprising:
 - waiting for a first failure indication, indicating that the second computing device failed to establish communications with the first computing device; and
 - if the first failure indication occurs before communications from the second computing device are received, then sending communications addressed to the second computing device.
5. The method of claim 4 wherein the first failure indication is in the set: an event associated with a timer associated with sending the first communications request addressed to the rendezvous service, reception of communications from the rendezvous service.

6. The method of claim 4 further comprising:
 - waiting for a second failure indication, indicating that the communications addressed to the second computing device failed to establish communications with the second computing device; and
 - if the second failure indication occurs before communications from the second computing device are received, then establishing communications with a relay service and sending a second communications request addressed to the rendezvous service, the second communications request specifying the relay service.
7. The method of claim 6 wherein the second failure indication is an event associated with a timer associated with sending the communications addressed to the second computing device.
8. The method of claim 6 wherein sending a second communications request addressed to the rendezvous service comprises sending an indication that the first computing device failed to establish communications with the second communications device.
9. The method of claim 6 wherein specifying the relay service comprises specifying an element in the set: a name of the relay service, a public address of the relay service.
10. The method of claim 6 wherein the second communications request further specifies an identifier of a session on the relay service.
11. A computer-readable medium having instructions for performing the method of claim 1.
12. A method for a second computing device to establish communications with a first computing device, the method comprising:
 - receiving a first communications request from a rendezvous service, the first communications request specifying the first computing device;
 - sending communications addressed to the first computing device; and
 - waiting to receive communications from the first computing device.

13. The method of claim 12 wherein specifying the first computing device comprises specifying an element in the set: a name of the first computing device, a public address of the first computing device, a public address of a Network Address Translator (NAT) behind which sits the first computing device.
14. The method of claim 12 further comprising:
establishing communications with the rendezvous service.
15. The method of claim 12 further comprising:
waiting for a first failure indication, indicating that the second computing device failed to establish communications with the first computing device; and
if the first failure indication occurs before communications from the first computing device are received, then sending communications addressed to the rendezvous service.
16. The method of claim 15 wherein the first failure indication is an event associated with a timer associated with sending the communications addressed to the first computing device.
17. The method of claim 15 wherein sending communications addressed to the rendezvous service comprises sending an indication that the second computing device failed to establish communications with the first computing device.
18. The method of claim 12 further comprising:
receiving a second communications request from the rendezvous service, the second communications request specifying a relay service; and
establishing communications with the relay service.
19. The method of claim 18 wherein specifying the relay service comprises specifying an element in the set: a name of the relay service, a public address of the relay service.

20. The method of claim 18 wherein the second communications request further specifies an identifier of a session on the relay service.
21. A computer-readable medium having instructions for performing the method of claim 12.
22. A method for a first computing device to establish communications with a second computing device, the method comprising:
 - sending first communications addressed to the second computing device, using an address and a first port number associated with the second computing device;
 - waiting to receive communications from the second computing device;
 - waiting for a first failure indication, indicating that the first communications failed to establish communications with the second computing device; and
 - if the first failure indication occurs before communications from the second computing device are received, then sending second communications addressed to the second computing device, using the address associated with the second computing device and a second port number.
23. The method of claim 22 wherein the first failure indication is an event associated with a timer associated with sending the first communications addressed to the second computing device.
24. The method of claim 22 wherein the second port number is a port number associated with sending encrypted communications to a firewall.
25. The method of claim 24 wherein the second port number is 443.

26. The method of claim 22 further comprising:
 - waiting for a second failure indication, indicating that the second communications failed to establish communications with the second computing device; and
 - if the second failure indication occurs before communications from the second computing device are received, then sending a first communications request to a proxy, requesting a proxy connection to the second computing device using the address and first port number associated with the second computing device.
27. The method of claim 26 wherein the second failure indication is an event associated with a timer associated with sending the second communications addressed to the second computing device.
28. The method of claim 26 further comprising:
 - waiting for a third failure indication, indicating that the first communications request to the proxy failed to establish communications with the second computing device; and
 - if the third failure indication occurs before communications from the second computing device are received, then sending a second communications request to the proxy, requesting a proxy connection to the second computing device using the address associated with the second computing device and a second port number.
29. The method of claim 28 wherein the third failure indication is in the set: an event associated with a timer associated with sending the first communications request to the proxy; reception of communications from the proxy.
30. The method of claim 28 wherein the second port number is a port number associated with sending encrypted communications to a firewall.
31. The method of claim 30 wherein the second port number is 443.
32. A computer-readable medium having instructions for performing the method of claim 22.

33. A method for a first computing device to establish communications with a second computing device, the method comprising:
 - sending first communications addressed to the second computing device, using an address and a first port number associated with the second computing device;
 - waiting to receive communications from the second computing device;
 - waiting for a first failure indication, indicating that the first communications failed to establish communications with the second computing device; and
 - if the first failure indication occurs before communications from the second computing device are received, then sending a first communications request to a proxy, requesting a proxy connection to the second computing device using the address and first port number associated with the second computing device.
34. The method of claim 33 wherein the first failure indication is an event associated with a timer associated with sending the first communications addressed to the second computing device.
35. The method of claim 33 further comprising:
 - waiting for a second failure indication, indicating that the first communications request to the proxy failed to establish communications with the second computing device; and
 - if the second failure indication occurs before communications from the second computing device are received, then sending second communications addressed to the second computing device, using the address associated with the second computing device and a second port number.
36. The method of claim 35 wherein the second failure indication is in the set: an event associated with a timer associated with sending the first communications request to the proxy; reception of communications from the proxy.

37. The method of claim 35 wherein the second port number is a port number associated with sending encrypted communications to a firewall.
38. The method of claim 37 wherein the second port number is 443.
39. The method of claim 35 further comprising:
 - waiting for a third failure indication, indicating that the second communications failed to establish communications with the second computing device; and
 - if the third failure indication occurs before communications from the second computing device are received, then sending a second communications request to the proxy, requesting a proxy connection to the second computing device using the address associated with the second computing device and a second port number.
40. The method of claim 39 wherein the third failure indication is an event associated with a timer associated with sending the second communications addressed to the second computing device.
41. The method of claim 39 wherein the second port number is a port number associated with sending encrypted communications to a firewall.
42. The method of claim 41 wherein the second port number is 443.
43. A computer-readable medium having instructions for performing the method of claim 33.